REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

I. CLAIM STATUS

Claims 1-63 and 81-92 were pending when last examined.

Claims 48-63 and 92 are withdrawn from consideration.

Claims 1-47 and 81-91 were examined and stand rejected.

Claim 1 has been amended to further clarify the arrangement of the sample compartments. Support for such amendment can be found in the specification as filed, for example, Example 2, section (b) and Example 3, section (a) (wherein there is not further partitioning within a sample compartment).

All amendments are made without acquiescence to the correctness of the Office, and merely to expedite examination.

No new matter has been added.

II. REJECTIONS UNDER 35 U.S.C. § 103

In item 1 on pages 2-10 of the Office Action, claims 1-34, 38-40, 42-47, 81-84 and 86-91 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Neuschäfer et al. (WO 96/35940) in view of Coassin et al. (US 6,660,233).

Further in item 2 on pages 10 and 11 of the Office Action, claims 35-37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Neuschäfer et al. in view of Coassin et al., as applied to claim 1, further in view of Hashimoto et al. (6,480,639).

Finally, in item 3 on pages 11 and 12 of the Office Action, claims 41 and 85 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Neuschäfer et al. in view of Coassin et al.

Applicants respectfully traverse these rejections.

Applicants further note that all rejections recite Neuschäfer et al. in view of Coassin et al. and therefore are addressed together.

The Examiner's Position

Specifically the Examiner contends that Neuschäfer et al. teaches a device comprising a sensor platform having one planar optical waveguide, a sealing layer forming a tight seal with a sealing medium, a plurality of sample compartments in a two-dimensional arrangement, each of the sample compartments comprising different biological recognition elements. The Examiner concedes that Neuschäfer et al. fails to teach the measurement areas being arranged in an array wherein there are at least two measurement areas in a width direction of the array and at least two measurement areas in a length direction of the array. However, the Examiner contends that Coassin et al. teaches a waveguide wherein at least two measurement areas are in a width direction and at least two measurement areas are in a length direction, in order to provide distinct regions of active sites for detection of target biomolecules. Therefore, the Examiner takes the position that it would have been obvious to a person having ordinary skill in the art to include in the device of Neuschäfer et al., an arrangement having at least two measurement areas in the width direction and two measurement areas in the length direction as taught by Coassin et al. because it is well known in the art that both arrangement are effective to produce rapid and equivalent detection results of a target biomolecule.

The Applicants' Position

Neuschäfer et al. teaches a waveguiding layer having at least one measuring region wherein the measuring region is further divided into at least two waveguiding regions. Each waveguiding region has an effective refractive index that is greater than the refractive index in the surrounding regions or the division in the waveguiding layer. See page 8, paragraph 3 of Neuschäfer et al. Moreover, Neuschäfer et al. teaches that "the refractive index is preferably the same for all waveguiding layers, that is to say all the waveguiding layers are preferably made from the same material." See the paragraph bridging pages 5 and 6 of Neuschäfer et al. Therefore, the sensor platform of Neuschäfer et al. appears to comprise a plurality of waveguides within a sample compartment. In contrast, the claimed invention comprises only a single waveguiding layer within a sample compartment.

Further, Neuschäfer et al. teaches away from the continuous waveguiding layer of the present invention. Specifically Neuschäfer et al. states "those arrangements in which various

specific binding partners are applied to a continuous waveguiding layer also have the disadvantage that the excitation light excites all of the fluorophore-labelled molecules…In addition, evanescently backcoupled fluorescence photons may contribute to the signal from the neighbouring dot and thus lead to measurement errors." See page 5, last paragraph.

The present invention comprises a device having sample compartments wherein each of said sample compartments has one planar optical waveguide and has different biological or biochemical recognition elements for specific recognition and binding of different analytes immobilized in five or more discrete measurement areas in a two-dimensional array. For example, the present specification discloses a device having 96 sample compartments, each comprising 400 measurement areas. See page 13, paragraph 2. Since each sample compartment of the present invention comprises a single continuous waveguide layer, it is clear that each measuring area has a plurality of neighboring dots. Since the separate and distinct waveguide regions, having distinct waveguide layers are an essential feature of Neuschäfer et al. and Neuschäfer et al. explicitly teaches away from multiple measurement areas on a continuous waveguide within a sample compartment, a person having ordinary skill in the art would lack motivation to modify Neuschäfer et al. by applying a plurality of measurement areas on a continuous waveguiding layer.

Further, Heron et al. also teaches that utilizing a continuous waveguide comprising sample compartments with a plurality of measurement areas would lead to measurement errors. For example, Heron et al. discloses a biosensor based on a continuous waveguide comprising sample compartments having a plurality of measurement areas on the surface of the waveguide, linearly arranged in the direction of light propagation. Further, Heron et al. teaches problems of uniformity in the intensity of the evanescent field within the continuous waveguide, which must be taken into account to avoid measurement errors. See page 17, column 1, lines 14-15 of Heron et al. Therefore, both Neuschäfer et al. and Heron et al. teach away from using a continuous waveguide in a sample compartment, asserting that such arrangement leads to measurement errors. In light of these references, a person having ordinary skill in the art would lack motivation and not have a reasonable expectation of success to achieve the present invention, which comprises a plurality of measurement areas in a single sample compartment.

Further, the Examiner's argument that "given the functional equivalence of the linear and two-dimensional arrangements of measurement areas taught by Coassin et al. and the separate waveguiding regions taught by Neuschäfer et al., one having ordinary skill would have recognized that light in each measurement area can be controlled separately" is misplaced. Specifically, there lacks functional equivalence between the linear and two dimensional arrangements taught by Coassin et al. and the waveguiding regions taught by Neuschäfer et al. As previously discussed, Neuschäfer et al. teaches that applying a plurality of dots on a continuous waveguide layer leads to measurement errors. Therefore, in view of Neuschäfer et al., a person having ordinary skill would lack motivation or have a reasonable expectation of success to place a plurality of measurements areas in a two dimensional arrangement on a continuous waveguide.

Moreover, in view of Neuschäfer et al. and Coassin et al., any attempt at such combination would yield a multi-layered waveguide with a first layer having measurement areas arranged on the X axis, and the second layer having measurement areas arranged on the Y axis because such arrangement would be expected to avoid the measurement errors taught by Neuschäfer et al. Note that such an arrangement does not yield a planar optical waveguide. Moreover, such arrangement is not effective to achieve miniaturization. Neuschäfer et al. explicitly states that "preference is given to arrangements that allow substantial miniaturization." See page 15, first paragraph. A person having ordinary skill in the art would recognize that the multi-layered device achieved by combining Neuschäfer et al. with Coassin et al. would lack substantial miniaturization, and therefore, would lack motivation to achieve such a device.

Further, as discussed above, a person having ordinary skill in the art would not be motivated to incorporate the two-dimensional arrangement of measurement areas of Coassin et al. with the teaches of Neuschäfer et al. with a reasonable expectation of success to achieve the present invention, i.e., a planar waveguide with sample compartments, each having a plurality of measurement areas, because Neuschäfer et al. and Heron et al. teach that such an arrangement, i.e., a plurality of neighboring dots, would lead to measurement errors.

The Examiner further contends that "the combination of Neuschäfer et al. and Coassin et al. does not require a change in optical waveguide detection because each waveguiding region is detected separately." See page 15 of the Office Action. However, it is the purpose of the present

invention to achieve miniaturization of the device with small volume sample compartments wherein a multitude of analytes can be determined simultaneously. See page 11, paragraph 3 of the specification. This is achieved for example with a device having 96 sample compartments each comprising 400 measurement areas. See page 18, paragraph 2 of the specification. In light of the multitude of measurement areas, a person having ordinary skill in the art would lack motivation to combine the teachings of Neuschäfer et al. and Coassin et al. because passing each measurement area under excitation and detection optics separately, i.e., one after another, would be excessively burdensome.

In light of the above, it is clear that the combination of Neuschäfer et al. and Coassin et al. does not teach or suggest all the limitations of the claimed invention. Further, a person having ordinary skill in the art would lack motivation to combine such references with a reasonable expectation of success because such combination would be expected to yield measurement errors and fail to achieve substantial miniaturization.

Accordingly this rejection is overcome and should be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, the present application is in condition for allowance and early notice to that effect is hereby requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact the undersigned attorney at the telephone number below.

The Commissioner is authorized to charge any deficiency or to credit any overpayment associated with this communication to Deposit Account No. 23-0975, with the EXCEPTION of deficiencies in fees for multiple dependent claims in new applications.

Respectfully submitted,

Andreas ABEL et al.

/William R. Schmidt, II/ Digitally signed by /William R. Schmidt, II/ DN: cn=/William R. Schmidt, II/, o=WLP, ou, email=bschmidt@wenderoth.com, c=US Date: 2009.09.03 14:58:33 -04'00'

By:_____

William R. Schmidt, II
Registration No. 58,327
Attorney for Applicants

WRS/cg/vah
Washington, D.C. 20005-1503
Telephone (202) 721-8200
Facsimile (202) 721-8250
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